METHOD FOR MAKING A MOISTURE SEALED CONNECTION BETWEEN AN ELECTRICAL LEAD AND A THERMISTOR OF A TEMPERATURE SENSOR.

[0001] The present invention relates to a method for making a thermistor of a temperature sensor according to the prelude of the patent claim 1.

[0002] In the technology of air conditioning as well as in the technology of refrigeration and cooling devices there is a requirement of bedewable ,that is , moisture sealed , lead connected temperature sensor for measuring the temperature of the evaporators and/or of the air conditioned rooms. According to the information of the reporter such kinds of temperature sensors are cast in plastic sockets. In the region of interface cable (lead) and the sensor casing and/or casting in the plastic socket the problem crops up of sealing the entry of the moisture. Such systems are therefore not leak proof.

[0003] This problem can be solved by costly and more or less unsatisfactory methods by applying additional shrinkage tubes, sealing elements or by additional pasting of the interface.

[0004] The document JP – A –6151653 discloses a method according to the preamble of the claim 1

[0005] The objective of the present invention is to provide a simple and reliable method for making a moisture sealed connection of the type in question

[0006] This problem is solved by the method mentioned at the beginning , as per the invention, by the characteristics of the typical part of the patent –claim 1

[0007] Further developments of the invention are the subject of subclaims

[0008] The invention is explained in details with the embodiments as per the figures of the drawing . It shows :

Fig 1: A first example of operation of the temperature sensor prepared as per the invention

Fig: 2 : A second example of operation of the temperature sensor prepared as per the invention

[0009] According to fig 1 a thermister 4 is electrically and mechanically mounted on the lead conductor 2 and 3 jutting out of the cable. This can take place, for example, by means of a temperature stable soldering connection, by welding or crimping(?) of the cable conductors 2 and 3 with electrodes and / or connections of the thermistor 4 not presented in details.

[0010] The thus prepared unit made of lead 1 and thermister 4 is inserted , as per the invention , in a jet mould and in the region or area of the lead end and the thermistor 4, located on , plastic 5,for example thermoplast , which stick firmly and densely on the sheathing material of the lead ,is encapsulated in the described manner. As a result a moisture sealed connection of the sensor- head by means of plastic 5 is formed on the lead – end in the region of the thermister β.

[0011] As material combinations for cable sheathing material and the sensor head material the following materials , for example ,have proved to be advantageous . If the cable sheathing material is polyvinylchloride then the sensor head material is polybutylene terephthalate (PBT) .If the cable sheathing material is built on the polypropylene base then polypropylene or high pressure polyethylene is suitable as sensor head material.

[0012] In the case of higher demands on the positioning of the thermistor 4 within the sensor head a multistage injection moulding operation can take place in the further development of the invention. A specimen example of a temperature sensor prepared in a two stage injection moulding operation is presented in fig 2, in which similar parts as in fig 1 are shown with the same reference signs. In the case of this specimen model a second encapsulation 7 is provided over the first encapsulation 5. In order to be able to position the combination of lead 1 and thermistor 4 in a jet mould in a still better manner the positioning elements 6 can be provided at the encapsulation 5 , which can be co-injected in the jet mould for the preparation of encapsulation 5 directly.

Patent claims :

1) Method for making a moisture-sealed connection between an electrical lead(1) and a thermistor (4) of a temperature sensor, in which firstly thermistor terminals are connected electrically and mechanically to conductors (2,3) of the lead (1) and then the end of the lead and the thermistor (4) located on it are encapsulated in a multi stage injection moulding operation in a plastic (5,6,7) adhering in a secure and sealed manner to the sheathing material of the lead, with a first encapsulation (5) , having positioning elements (6) , being carried out in a first-injection moulding operation, characterized in that a second encapsulation (7) ,which completely encloses the first encapsulation, is moulded into the first encapsulation (5) and the positioning elements(6) in a second injection-moulding operation.

2) Method according to claim 1 , characterized in that a thermoplastic is used as the plastic(5;5,6,7)
3) Method according to claim 1 and /or 2, characterized in that the encapsulation in plastic

(5;5,6,7) is carried out in a multi-stage injection-moulding operation.